

Notice of Allowability

Application No.

10/724,104

Examiner

Jaworski Francis J.

Applicant(s)

ABE ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

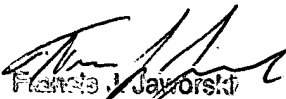
1. ☒ This communication is responsive to IDS12-01-03.
2. ☒ The allowed claim(s) is/are 1 - 29.
3. ☐ The drawings filed on _____ are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☒ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 - * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 12142004.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 12012003
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


Francis J. Jaworski
Primary Examiner

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In Claim 1 line 8 an obvious typographical error has been corrected by deletion of the non-sequitur "the object ". See also Claim 9 correct language.

In claim 23 another obvious typographical error has been corrected "M-more " to -- M-mode --.

A correction to the drawings should be made as follows:

In Figs 1 and 15 it appears that all lead arrows to Image storage circuit 28 should be bi-directional.

[Image storage circuit 28 either stores within itself a sequence of B-mode and also Doppler images (per specification page 12 lines 20 – 24 and page 20 lines 16 - 25) or, being a circuit and not inherently a memory causes display memory 30 to act as a work memory as well as a display memory and store this image sequence while it is being operated on by processor 29 (For specification

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page 13 lines 18 – 21 after 'through' infer -- the control of --, for example:.) .

Irregardless of whether circuit 28 is a discrete memory and memory 30 is only a display buffer or circuit 28 has no internal memory and uses part of memory 30 as its work buffer, a distinction wholly non-essential for enablement purposes, neither can take place unless image data or controls can get back out of this device 28.

Image processor 29 apparently uses image data stored in 28 or stored by means of 28 in two ways – first it sets an overlay LOI (line of interest) onto the particular stored (duplex) B/D image (spec page 12 lines 24 –27) and second, given that the spatio-temporal result (first embodiment) or temporal tracking result (second embodiment) are under a broad definition of M-mode meaning not merely time-motion but time – physiologic characteristic (movement velocity/strain/acceleration/displacement/pressure) the processor 29 must extract the characteristic based upon correlated points across multiple images and/or multiple points from each contributing image (Figs. 12) within images which provide value averages and then give its results for display (spec page 13 lines 3 – 12), which cannot take place without input from 28 and output to 30.

The net is that the data paths between 28 and 29 and 30 in Fig. 1 aren't logical unless they are bi-directional. And since Fig. 15 contemplates a stand-alone apparatus for the image processing section 6 to which 28-30 belong (spec page 47 lines 12 – 19) the same need for drawing revision applies there as well.]

In order to avoid abandonment of the application, applicant must make these changes.

The following is an examiner's statement of reasons for allowance:

Applicants' claim sets pertain to:

1) An 'embodiment 1' system apparatus (Claims 1 –9) and method (Claim 26) and stand-alone display apparatus (Claim 24) for providing display of spatial and temporal profiles of a physiologic characteristic for a cursor-identified spatial position associated with an arbitrary M-mode image as well as display of the arbitrary M-mode image, and a display apparatus for a plurality of such spatial and temporal profiles and arbitrary M-mode images at a plurality of such cursor-identified spatial positions (claim 28)

2) An 'embodiment 2' apparatus (Claims 9 –23) and method (Claim 27) and and stand-alone display apparatus (Claim 25) for providing display of a temporal profile for at least one time phase of a physiologic characteristic for a cursor-identified spatial position associated with an arbitrary M-mode image as well as display of the arbitrary M-mode image, and a display apparatus for a plurality of .of such temporal profiles and arbitrary M-mode images at a plurality of such cursor-identified spatial positions. (Claim 29).

Therefore the allowance reasoning is in two parts:

Olstad et al (US5820561 of record with the IDS filed on 12-01-2003) is directed to forming one or more arbitrary M-mode lines on an ultrasound image and invokes the earlier Olstad et al (US5515856) as an incorporation by reference and which is directed to formation of one or more virtual M-mode lines (i.e. unassociated with a scanline direction) on an ultrasound image, and where '561 proposes luminance display of plural arbitrary M-mode lines as well as luminance display overlay of a spatial profile of a physiologic characteristic 510 i.e. tissue velocity over a time phase 59 – 511 and also separate temporal display of a physiologic characteristic 68 over a time interval 66 – 69.

Criton et al (US6537221) is directed to forming what is definable as an arbitrary M-mode line by taking a mid-point along the endocardial-to-epicardial direction for incorporation into an automatically drawn intra-myocardial line 100 of spatial positions 1 – 8 along which physiologic characteristics (Doppler tissue velocity/power/variance or strain rate) may be calculated, see col. 10 lines 2-57 and Fig. 11) and a spatio-temporal luminance display 102 derived therefrom. And also plural such arbitrary M-mode traces are made to perform strain rate analysis and again provide a luminance display, see col. 12 line.44 – col. 13 line 13.

In Olstadt et al no structure is taught for implementing simultaneous M-mode and spatio-temporal luminance display or cursor-controlled display, however assuming arguendo that paired data sets 4A-B, 5A-B or 6A-B represent

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simultaneous display pairs selected by cursor, such are deficient on both counts with respect to the languages of the embodiment 1 and 2-grouped claims since embodiment 1 language requires the grouping of spatial and temporal profiles together with the arbitrary M-mode on display and Olstadt et al lacks suggestion how to meaningfully relate the Fig. 5 B spatial profile for all positions and a time delay sufficient to create lag and the temporal display for an unrelated position (?) in Fig. 6B into one organized display, and regarding embodiment 2 Olstad et al lacks suggestion to associate a tracking line with a temporal profile of a physiological characteristic associated with such a line.

Since Criton et al adopts a scorecard approach to collapsing spatio-temporal data into results for the segment locations 1-8 along the arbitrary M-mode line, it is further off point to the stated essentials claimed within the applicants' claims.

Sano (US5701897, of record) variously in figs.83 – 93 teaches the prior art spatio-temporal luminance and/or colorized display.


Murashita et al (US5568812) is similar to the earlier Olstad et al in that the linear M-mode lines used therein are 'freely settable'.

Iinuma et al (US5785654) is directed to plural depth point spatio-temporal tracking.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.



Francis J. Jaworski
Primary Examiner

FJJ:fjj

12-14-2004